



Aviation Weather Information

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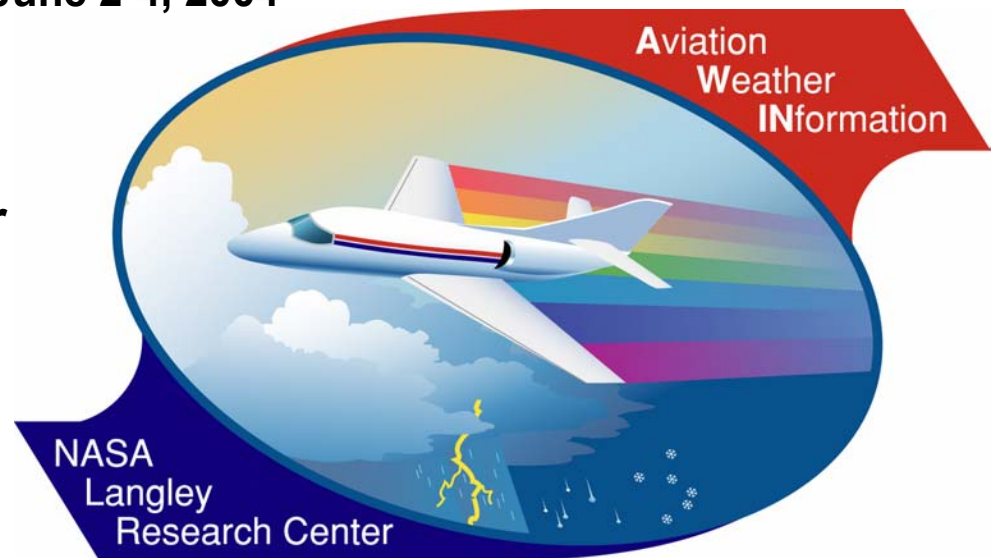
Overview

NASA Aviation Safety and Security Program

Weather Accident Prevention Project Review

June 2-4, 2004

**Paul Stough
NASA Langley Research Center
Hampton, VA**





Outline

Aviation Weather Information

- **Plan**
- **Targeted problems**
- **Path to completion**



Plan

Aviation Weather Information

Goal

Develop technologies and methods for providing pilots with sufficiently accurate, timely and intuitive information during the en route phases of flight which, if implemented, will enable a 25 to 50% reduction in aircraft accidents attributable to lack of weather situation awareness

Objectives

Develop Needed Weather Products and Sensing Capabilities

Develop Enhanced Weather Presentations and Decision Aids

Challenges

Improved Forecasts Need Better Input Data

Existing Aircraft Need Retrofit Capability

Pilot Workload Should Not Be Increased

Diverse Aviation User Groups

Approach

Use Aircraft and Satellites as Wx Data Collectors

Develop Technologies for Installed and Portable Systems

Provide Decision Aids and Operational Guidelines



Technology Development

Aviation Weather Information

Weather Channel in the Cockpit

Implementation Catalyst

Develop viable 1st generation systems

Stimulate implementation

1998

2001

2005

Information; Not Data

Next generation technologies

Data fusion

Alerting and decision aiding



Targeted Problems

Aviation Weather Information

- 1. Lack of sufficient atmospheric data that are needed for improved aviation forecasts and operational updates**
 - **Lower atmosphere**
 - **Oceanic and remote regions**
 - **High-resolution data**
- 2. Inability of pilots to understand and effectively use cockpit weather information**



Develop Needed Weather Products and Sensing Capabilities

- **ASAP - Advanced Satellite Aviation-weather Products**
- **TAMDAR - Tropospheric Airborne Meteorological Data Reporting**

Develop Enhanced Weather Presentations and Decision Aids

- **Cockpit Presentation of Weather Information**
 - **General Aviation Airplanes**
 - **Transport Airplanes**



Transport Experiments

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August 2003

**Initial AHAS
Cockpit
Evaluation**

May 2004

**AWIN-TPAWS
Integration
Simulation**



June 2005

**Final Flight
Experiment**

Sept 2005

**Final
Report**



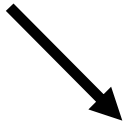


GA Flight Experiments

Aviation Weather Information

May 2004

TAMDAR



Aug 2004

Eye Tracker



April - June 2005

**Next Generation
Applications**



Sept 2005

**Final
Report**





Target GA Capabilities

Aviation Weather Information

- **Pre-flight weather transfer to cockpit**
- **Flight constraints**
 - User preferences
 - Airplane limitations
- **Trending of forecast versus observations**
 - En route
 - Destination
- **Advanced NEXRAD looping**
- **Route-specific alerting**
 - Trends
 - Significant weather
- **PIREP template**
- **TAMDAR display**
- **Voice interface**



Summary

Aviation Weather Information

- **Partnership with FAA, NOAA, industry and academia**
 - to develop affordable and effective technologies for datalink cockpit weather information systems
 - to realize the goal of reducing weather-related accidents
- **First generation systems on the market**
- **Enhancements, operational guidelines and technologies for next generation systems**
- **Final experiments in 2005**